

Extraction

Design an acid/base extraction to separate a mixture of 2 or 3 compounds

Note: Based on the chemical structure, you will need to be able to recognize the relative pKa's and determine whether the compound is acidic, basic or neutral.

Recrystallization

Explain the recrystallization procedure.

Evaluate the relevant physical properties of the chemicals used in a recrystallization.

Identify procedural errors.

Identification by Physical Properties (mp, density, solubility, refractive index, R_f , and t_R)

Determine which physical properties are relevant to extraction, recrystallization, solubility, chromatography.

Describe how physical property measurements can indicate the purity (or lack of) for a compound.

Chromatography

Explain the process of chromatographic separation.

Predict how the elution of compounds will change when the stationary or mobile phase is changed.

Interpret chromatograms of unknown mixtures using standard chromatograms.

Identify the components via t_R .

Calculate the % composition of a mixture using peak height or peak area.

Draw the basic components of a gas chromatograph

gas source, injector, column, oven, detector, chromatogram

Identify procedural errors.

Distillation

Draw a schematic of a simple and/or fractional distillation apparatus.

Use a temperature-composition graph to determine the % composition of a distillate and

identify the presence of an azeotrope.

Predict the bp of a liquid at reduced pressure using a nomograph.

Identify procedural errors.

Qualitative Tests

Know the chemical reactions for the qualitative tests performed in this course.

Provide a physical description of a positive reaction.

Design a system of qualitative tests to determine the functional group of an unknown compound.

Interpret the results of qualitative tests to determine the functional group of an unknown compound.

 S_N1 Kinetics

Explain how the titrations were used to monitor reaction progress.

Use titration data to explain the effect of solvent polarity on S_N1 reactivity.

Chiral Resolution

Be able to explain the terms: enantiomer, diastereomer, racemic mixture

Be able to use the equation for calculating observed rotation

Be able to calculate e.e. from observed rotations

Be able to

Calculate molar masses from line angle structures.

Calculate the theoretical yield.

Calculate percent yield.

Determine the empirical and molecular formula from % composition data and the molar mass.